

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
29 April 2004 (29.04.2004)

PCT

(10) International Publication Number  
**WO 2004/035791 A1**

- (51) International Patent Classification<sup>7</sup>: C12N 15/29, 15/60, 9/88, A01H 5/00
- (21) International Application Number: PCT/NZ2003/000229
- (22) International Filing Date: 15 October 2003 (15.10.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
521984 15 October 2002 (15.10.2002) NZ
- (71) Applicant (for all designated States except US): **THE HORTICULTURE AND FOOD RESEARCH INSTITUTE OF NEW ZEALAND LIMITED** [NZ/NZ]; 120 Mt Albert Road, Mt Albert, Auckland (NZ).
- (72) Inventors; and  
(75) Inventors/Applicants (for US only): **GREEN, Sol, Alexander**, [NZ/NZ]; 3/3 Park Ave, Takapuna, Auckland (NZ). **FRIEL, Ellen, Nicola**, [GB/NZ]; 8/23B Western Springs Road, Western Springs, Auckland (NZ). **BEUNING, Lesley, Leah**, [NZ/NZ]; 11 Meryl Avenue, Huapai (NZ). **MACRAE, Ann, Elspeth**, [NZ/NZ]; 120 Mt Albert Road, Mt Albert, Auckland (NZ).
- (74) Agents: **CALHOUN, Douglas, C., et al.**; A J Park, 6th Floor Huddart Parker Building, Post Office Square, PO Box 949, 6015 Wellington (NZ).
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:**  
— with international search report
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: PLANT ALPHA FARNESENE SYNTHASE AND POLYNUCLEOTIDES ENCODING SAME

(57) Abstract: The present invention provides an isolated alpha-farnesene synthase and polynucleotide sequences encoding the enzyme. The invention also provides nucleic acid constructs, vectors and host cells incorporating the polynucleotide sequences. It further relates to the production of alpha-farnesene using the enzyme and modulation of alpha-farnesene synthesis in plants and selection of plants with altered alpha-farnesene synthase activity.

WO 2004/035791 A1

**A. CLASSIFICATION OF SUBJECT MATTER**Int. Cl. <sup>7</sup>: C12N 15/29, 15/60, 9/88; A01H 5/00

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

SEE BELOW

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SEE BELOW

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

AGRICOLA: farnesene or sesquiterpene synthase, apple DGENE, PROTEIN DATABASES (PIR, SWISSPROT, EMBL, GENPEP): Seq ID 2, sesqui, mono, di terpene, farnesene

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	Genpept Accession No AAO22848 (11 July 2003) Pechous SW et al (E,E) -alpha-farnesene synthase [Malus x domestica] Identical to SEQ ID NO 2	All
X	DGENE Accession No AAB29400 & JP 2000245482 A (SOZOTEKI SEIBUTSU KOGAKU KENKYUSHO KK) 12 September 2000 See abstract and sequence (38% identity, 59% similarity Seq ID 2)	1, 2, 13, 19-22, 24-26, 28, 29, 37, 40



Further documents are listed in the continuation of Box C



See patent family annex

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search  
19 January 2004

Date of mailing of the international search report

23 JAN 2004

Name and mailing address of the ISA/AU

AUSTRALIAN PATENT OFFICE  
PO BOX 200, WODEN ACT 2606, AUSTRALIA  
E-mail address: pct@ipaaustralia.gov.au  
Facsimile No. (02) 6285 3929

Authorized officer

TERRY MOORE

Telephone No : (02) 6283 2632

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Vasanth Rupasinghe HP et al "Sesquiterpene $\alpha$ -farnesene synthase: Partial purification, characterization, and activity in relation to superficial scald development in apples" J Amer Soc Hort Sci (2000) 125(1), pages 111-119 See whole document, in particular Materials and Methods and Results	13-18
X	WO 1999 015624 A1 (WASHINGTON STATE UNIVERSITY RESEARCH FOUNDATION) 1 April 1999 See in particular example 5, SEQ ID NOS 1 and 2 (38% identity, 59% similarity with SEQ ID NO 2)	1, 2, 13, 19-22, 24-26, 28-31, 38, 40
X	WO 2000 017327 A2 (UNIVERSITY OF KENTUCKY RESEARCH DEPARTMENT ET AL) 30 March 2000 See in particular SEQ ID NO 26, claims 144-161 (38% identity, 59% similarity with SEQ ID NO 2)	1, 2, 13, 19-22, 24-26, 28-31, 38, 40

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/NZ2003/000229

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
WO	0017321	CA	2344399	EP	1112348	US	6582960
WO	9915624	AU	95096/98	CA	2304799	EP	1017788
		US	5891697				
JP	2000245482						
							END OF ANNEX